NOTES 15: MORE ON TESTING

Stat 120 | Fall 2025

Prof Amanda Luby

	H_0 True	H_0 False
Reject H_0		
Do not reject H_0		

Type I Error

Rejecting H_0 when H_0 is true

Type II Error

Failing to reject H_0 when H_0 is false

α (Significance Level)

The probability of making a Type I error is α (which we get to decide.)

β

The probability of making a Type II error

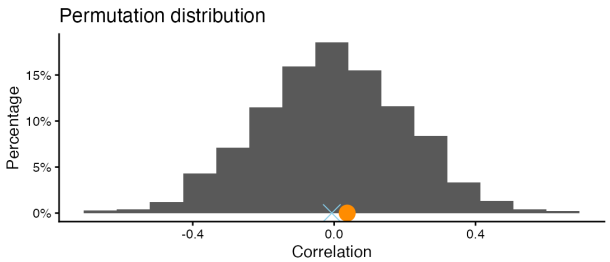
Power

The probability of rejecting H_0 when H_0 is false (High power = good, low power = bad). Equal to $1 - \beta$

Example: A public health researcher believes that there is a positive relationship between heart rate and age among ICU patients. Data from 23 patients gives $r = 0.037$. Do you think the probability of a Type II error is higher if $\rho = .9$ or $\rho = .1$?

$H_0 : \rho = 0$

$H_A : \rho > 0$



Big Picture Picture

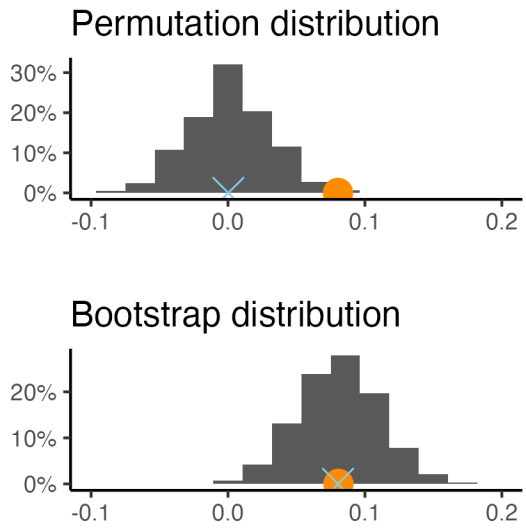
Sampling Distribution **Bootstrap Distribution** **Null Distribution**

Connection to Confidence Intervals

If the value of H_0 is *outside* of the confidence interval, we _____.

If the value of H_0 is *inside* the confidence interval, we _____.

Illustration: (Social Media Poll Example)



1 Statistical vs Practical Significance

Example: Breaking news! I have a proven way to improve your exam scores! The difference in Exam 02 scores between students who do this and students who don't is statistically significant! All you have to do is come to every office hour, read each chapter of the textbook 5 times, and do every single problem in the book.

Parameter:

Sample Statistic:

Statistical vs Practical Significance

When making conclusions, it's important to consider **effect size** alongside *statistical significance*